Vol. 40, pp. 99–110 June 30, 1927

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF NEW GENERA AND SPECIES BELONGING TO THE COCCID FAMILY MARGARODIDAE.

BY HAROLD MORRISON.

The very brief characterizations offered below are presented now in order to make the units established conveniently available for detailed discussion in an extended paper on the classification of these coccids. There is every reason to believe that this paper, which has been completed, will appear within a reasonable time.

Since Professor G. F. Ferris has recently undertaken to elevate the old family Coccidae to a superfamily through the establishment within it of several families based on old subfamilies or on anomalous groups or genera, it is necessary, in order to maintain a proper balance in the new and more nearly adequate coccid classification that is very gradually developing, to erect another new family for the insects here considered, although very much better knowledge of both the coccids and related Homoptera must be acquired before such family units can be certainly accepted as satisfactory zoological units.

Family **Margarodidae**, new family.

This new family is created for the reception of the subfamilies and genera included in the subfamilies Monophlebinae and Margarodinae of the Fernald Catalogue of the Coccidae, 1903, plus the genera newly described since that date as belonging in these two subfamilies, plus those that have been shown to be properly assignable to one of the two, plus certain new groups and genera characterized below. The name is based on the genus *Margarodes*, the earliest genus erected within its limits. From our present knowledge, it is separated from all other coccids, excepting only that group of genera and species currently known as the subfamily Orthezinae, through the normal possession of abdominal spiracles in various numbers according to the genus, presumably in all stages, although their

presence has not yet been demonstrated for every stage of every species, and through the presence in the adult male stage, with very few exceptions, of well developed compound eyes.

Family **Ortheziidae,** new family.

The characters that separate the insects heretofore associated in the subfamily Ortheziinae from the Margarodidae appear to be of sufficient importance to justify the erection of a family for this compact and relatively homogeneous group of genera. This family agrees with the Margarodidae in the possession of abdominal spiracles, although their presence has not yet been demonstrated for a few species, and in the presence of very well developed compound eyes in the adult male. It differs strikingly in the possession, in all the female and in the early male stages, of a well developed flat anal ring, bearing setae, of the general type found in *Pseudococcus* and many other genera. This structure is not even approximated in the Margarodidae. In addition, the antennae of the adult male are normally 9-segmented and bear a stiff seta or spine at the tip of the apical segment; in the Margarodidae the adult male antennae are usually 10-segmented, although there are some described variations in this and there is no single stiff apical seta. In addition, the penis sheath of the Ortheziidae appears distinctly bivalved while it appears entire with species of Margarodidae.

As a result of the studies from which the present notes have been abstracted it has been considered necessary to introduce a very complete rearrangement of the genera examined, accompanied by the erection of various new subfamilies, tribes and genera. A summary review of these follows:

Subfamily **Xylococcinae** Pergande.

The subfamily Xylococcinae as here used includes only four genera. These have been arranged in three tribes as follows:

Tribe **Stigmacoccini,** new tribe.

This includes only the genus *Stigmacoccus* Hempel with its single species *S. asper* Hempel. The characters of the genus may, for the present, stand for the tribe as well.

Tribe **Xylococcini** Cockerell.

Included here are two genera, one *Xylococcus* Löw, the other previously undescribed. Through the kindness of Dr. F. Maidl of the Natural History Museum of Vienna, Austria, some of Löw's material of his *Xylococcus filiferus* has been examined. From this it appears that Löw was, in general, correct in his characterization of the condition of the adult female, which actually has very greatly reduced antennae and legs and remains enclosed in the cavity already produced by the earlier stages and within the cast preadult skin. A new genus is therefore required for the North American species previously placed in *Xylococcus.*

Genus **Xylococculus,** new genus.

Genotype.—Xylococcus betulae Pergande.

This genus differs most obviously from *Xylococcus* through the retention of well developed legs and antennae in the adult female. See Pergande's extended article (U. S. D. A. Div. Ent. Bull. 18, 1898, p. 26, et seq.) for an elaborate description of the genotype.

Tribe **Matsucoccini,** new tribe.

Here is placed only the single genus *Matsucoccus* whose genotype is *M. matsumurae* Kuwana. For the present the characters of the genus, as described by several writers, will serve for the tribe.

Subfamily **Steingeliinae,** new subfamily.

This subfamily is now based on a single tribe, Steingeliini, new tribe, which in turn is based on two genera, *Steingelia* Nassanow and *Stomacoccus* Ferris. The broader characters of the genus *Steingelia* as described by Nassanow will serve temporarily to indicate the nature of this subfamily and tribe.

Subfamily **Margarodinae** Cockerell.

The subfamily Margarodinae is here restricted to five genera which have been grouped in three tribes. All of these have been established previously. The first is Kuwaniini Handlirsch, including the genus *Kuwania* Cockerell and the following new genus:

Genus **Neosteingelia,** new genus.

A genus of margarodine coccids related to *Kuwania* Cockerell, but with the adult female lacking the capitate setae at the apex of the tibia of that genus and with six well developed and two poorly developed pairs of abdominal spiracles instead of the four (or sometimes six) pairs of *Kuwania*. Ventral cicatrices are present in the preadult female and first larval stages, while these are lacking in *Kuwania*.

Genotype.—Neosteingelia texana, new species.

The generic characters given briefly above will serve temporarily to establish this new species, which is based on several specimens of adult female, intermediate female, larval and adult male stages forwarded to the Bureau of Entomology by H. G. H. Weinert collected on bark of Hackberry (*Celtis* sp.) at San Antonio, Texas, in October, 1917 (holotype and paratypes) and on bark of *Hicoria ovata* at Pittsburgh, Pa., likewise forwarded to the Bureau, collected by S. W. Parmenter in October, 1923 (paratypes).

The types are in the U. S. National Collection of Coccidae.

The second tribe placed in this subfamily is the Margarodini of Cockerell, including two genera, *Margarodes* Guilding and *Neomargarodes* Green. A single new species of *Margarodes* is characterized below, as it has been used in part to illustrate the generic characteristics of the genus.

Margarodes meridionalis, new species.

The adult female of this species is closely related to the genotype, *M. formicarum*, differing from it in having the multilocular disk derm pores oval with bilocular center and a single encircling row of loculi. It also seems related to *M. papillosus* Green but differs in lacking any cluster of spines along the body margin anterior to the first abdominal spiracles.

This species is based on a few specimens of adult and preadult females from Southern United States collected as follows: On ground at Fort Myers, Fla., collected by Geo. M. Lummis, Jan. 1918 (holotype and paratypes) and from Chula, Georgia, forwarded by A. C. Lewis, May, 1918 (paratypes).

The types are in the U. S. National Collection of Coccidae.

The third tribe placed here is Callipappini Handlirsch which includes only one genus *Callipappus* Guerin-Meneville.

Subfamily **Coelostomidiinae,** new subfamily.

This subfamily is erected for the reception of genera that have been assigned previously to both Monophlebinae and Margarodinae. Seven genera distributed in three tribes are included. The assignment of the first two tribes and genera is tentative as their various stages are only incompletely known.

Tribe **Platycoelostomini,** new tribe.

Established to include one genus, *Platycoelostoma* Morrison, this tribe may be recognized from the generic characters described when the genus was published as new.

Tribe **Marchalinini,** new tribe.

This tribe is erected for the single genus *Marchalina* Vayssiere. The tribal characters may be derived temporarily from Vayssiere's discussions of this genus.

Tribe **Coelostomidiini,** new tribe.

In this tribe are included five genera, *Coelostomidia* Cockerell (*Coelostoma* of Maskell), *Ultracoelostoma* Cockerell, *Cryptokermes* Hempel, *Mimosicerya* Cockerell (*Clypeacoccus* of Newstead) and another, undescribed genus. To facilitate the later detailed discussion of this tribe and its components, first the new genus and then a new species are very briefly characterized.

Genus **Paracoelostoma,** new genus.

A genus related to the New Zealand *Coelostomidia* and *Ultracoelostoma* and the Neotropical *Cryptokermes* and *Mimosicerya*. The adult female has the posterior apex, around anal opening, somewhat chitinized, antennae short conical, with broadly rounded apices; openings of abdominal spiracles nearly as large as those of thoracic, claw digitules acute, not attaining

apex of claw and derm bearing spines. The preadult female has antennae and legs reduced to short conical protuberances, body enclosed within a stout test, and anal tube short, with band of wax pores at inner end, but without a band or circle of multilocular disk pores in the wall of the tube near the wax pores. The larva has the posterior apex of the body strongly chitinized as does *Ultracoelostoma,* but is conspicuously differentiated from all closely related genera in that the ventral cicatrices are arranged in two longitudinal rows of several each, rather than in a single transverse row of three.

Genotype.—Paracoelostoma peruviana, new species.

For the present the generic characters given above will give a sufficient basis for the recognition of this species. It is based on several specimens of different female stages from two lots of material, one lot (holotype and paratypes) from Despo Blado near Samán, Piura, Peru, collected by E. W. Rust, Apr. 24, 1912, the other (paratypes) from the same locality (Samán), collected by C. H. T. Townsend, May 21, 1910 (#228).

The types are in the U. S. National Collection of Coccidae.

Cryptokermes mexicanus, new species.

References.—Cryptokermes brasiliensis Hempel, Cockerell, Ann. Mag. Nat. Hist. (7) vol. 10, 1902, p. 469; Ferris, Can. Ent. vol. 50, 1918, p. 221.

This species is very similar to *brasiliensis,* but differs in the adult female stage in that the legs are represented merely by a cluster of setae and a wrinkling and thickening of the derm; the intermediate female differs in that it possesses relatively numerous stout spines, quite distinctly 6-segmented antennae, and much more fully developed legs; the larva differs in having the curious disks over the body flattened, or at most only slightly convex.

This species is based on several specimens of the various female stages from larva to adult obtained at Zapotlan, Jalisco, Mexico, on *Mimosa* sp., 1903, collected by C. H. T. Townsend (T. & B. Cy. #22) (holotype and paratypes) and from Cuautla, Morelos, Mexico, on *Mimosa* sp., July, 1897, collected by A. Koebele (#1609—Div. Ent. #7894—and #1672—Div. Ent. #7918) (paratypes).

The types are in the U. S. National Collection of Coccidae.

Subfamily **Monophlebinae** Maskell.

Except for the three genera removed to the subfamily Coelostomidinae this subfamily as here recognized includes all of the genera currently assigned to it. These are grouped into five tribes and several new genera are described.

Tribe **Monophlebini** Cockerell.

This tribe, originally including only the genus *Monophlebus,* has been expanded to accommodate several additional genera.

Genus **Monophleboides,** new genus.

The adult female of the genus is characterized by lack of cylindrical or other stout derm spines, although these are numerous in the preadult, by lack of any marsupium or other specialized reproductive structure, by the absence of large tubular bilocular pores along body margin, by the presence of a single ventral cicatrix, and by lack of disk pores within atrium of abdominal spiracles. The larva lacks large marginal bilocular tubular pores, has only a single apical pair of elongated marginal setae, a single ventral cicatrix and short and stout antennae with second and third segments nearly equal in length.

The genotype is *Monophlebus gymnocarpi* Hall.

Genus **Monophlebidus,** new genus.

This new genus is characterized by having in the adult female stage seven pairs of abdominal spiracles each of which possesses a conspicuous collar of disk pores within atrium and very numerous small circular ventral cicatrices grouped into clusters, these forming two broad longitudinal bands one on each side of body ventrally. In addition, there is no evidence that a marsupium, ovisac or other specialized arrangement for caring for the eggs is developed. The adult male has antennae with cylindrical segments, having no traces of nodes or of distinct whorls of setae, a slender penis sheath and a single pair of very elongate apical fleshy tassels.

Genotype.—Monophlebidus indicus, new species.

This species is sufficiently characterized for the present in the statements given under the genus.

It is based on specimens collected by Mr. S. Mahdihassan on *Shorea talura* (Dipterocarpaceae) at Bangalore, India.

The holotype female is in the U. S. National Collection of Coccidae. Paratypes, including a paratype adult male, are in the collection of Mr. E. E. Green. The specific name *indicus* is taken from a manuscript one originally assigned to this insect by Mr. Green.

Genus **Pseudaspidoproctus,** new genus.

This genus may be characterized as follows: Adult female with the abdominal spiracles simple, that is without disk pores within atrium, ventral cicatrices three, elongate, grouped close together, no elongate tubular bilocular pores at body margin, derm with cylindrical spines, and with a ventral marsupium having a U- or V-shaped opening; larva without marginal elongate tubular bilocular pores, with elongate lateral marginal setae in addition to the apical pair, and antennae with the third segment much elongated, nearly twice length of second.

The genotype is *Aspidoproctus hypheniacus* Hall described from Egypt.

Genus **Hemaspidoproctus,** new genus.

This genus is characterized by having the adult female with the abdominal spiracles small and inconspicuous, without pores within atrium,

with not over about seven ventral cicatrices arranged in a transverse row, with the ventral surface of the abdomen with a complete band of pores around the margin similar to the ovisac band of *Icerya*, this band forming a pad of secretion over the enclosed area, and the enclosed derm invaginating towards the dorsal surface forming a half-marsupium. The larva has large marginal bilocular tubular pores, elongate marginal setae in addition to the apical pair, a single median ventral cicatrix, the dorsal spines in longitudinal bands, not split up into separate clusters and only a few (4–6) multilocular disk pores within anal tube.

The genus is based on two species from Ceylon and India. The genotype is *Walkeriana cinerea* Green. The other included species is *W. euphorbiae* Green.

Tribe **Drosichini,** new tribe.

This tribe is based on the genus *Drosicha* Walker, together with two new genera described below. Members of the tribe may be recognized by this combination of characters: Adult female without spines on the derm, antennae not more than 9-segmented, thoracic spiracles without a band or cluster of disk pores at opening, with seven pairs of abdominal spiracles, with three large oval ventral cicatrices placed close together; hairs on body mostly very abundant and closely crowded; larva with 5-segmented antennae and no spines but many hairs over body; adult male with the antennal segments beyond the second trinodose, with each bearing three whorls of setae, abdomen with at least two and sometimes with as many as five pairs of fleshy tassels developed; basal diagonal vein elongate, somewhat curved, tip approaching closely to wing margin, costal margin of wing blackish and apical antennal segment about as long as preapical, or costal margin bright red, but apical antennal segment perhaps twice length of preapical.

Genus **Drosichiella,** new genus.

This genus is established for the reception of two described species, *Monophlebus tamarindus* Green, and *M. phyllanthi* Green. A third species is described below. The members of the genus are rather closely related to *Drosicha* Walker, differing in the adult female stage, the only one known definitely, in the possession of a conspicuous collar of multilocular disk pores, within the atrium of each abdominal spiracle and in the rather pronounced tendency towards the chitinization of the derm at maturity. The species *Monophlebus tamarindus* Green is designated as the genotype.

Drosichiella tectonae, new species.

Adult female.—Character of external secretion not known, body elliptical, length around 15 mm., width a little less than two-thirds of length; derm at maturity relatively heavily chitinized, dark yellow brown in color, with innumerable small areolations around the seta and hair bases and the pores; antennae normally 8-segmented, similar to the antennae of related species; legs also similar; abdominal spiracles with the collar of disk pores within atrium averaging around 25 to 30 in number; derm disk pores mostly

quadrilocular; body hairs of moderate length, mid-dorsal averaging around 36μ in length, mid-ventral around 55μ, the ratio between the two 1 to 1.6; other structures very similar to those found in known congeneric species.

The species has been described from three mounted specimens. The holotype was collected on *Tectona* sp. (teak) at Berar, India, by E. P. Stebbing and was received from Mr. E. E. Green in April, 1926. One paratype was also received from Mr. Green at the same time, and was labeled as having been found "on ground" in the Ganjam District, Madras, India, collected by J. Burkill. The other paratype is an early adult from the Maskell collection where it had been placed as *Monophlebus* (*Drosicha*) *contrahens* Walker under collection number 94. This insect was erroneously referred by the writer to the species *tamarindus* Green (See Proc. U. S. N. M., vol. 62, art. 17, 1923, p. 1).

The types are in the U. S. National Collection of Coccidae.

This is almost certainly the *Monophlebus tectonae* of Stebbing which was published without description in 1902.

Genus **Drosichoides,** new genus.

This new genus is established for certain male monophlebine coccids described from Celebes and Palawan. No other stages are known. These males are very similar to those of the genus *Drosicha*, differing in having a stout, only gradually tapering penis sheath that is not evidently constricted at any point, a conspicuously elongate terminal antennal segment that is fully twice the length of the preapical, and a bright red costal wing margin.

The genotype is *Llaveia haematoptera* Cockerell. *L. sanguinea* Cockerell is also included.

Tribe **Monophlebulini,** new tribe.

This tribe is established here for the reception of two Australian genera, *Monophlebulus* Cockerell and *Nodulicoccus* Morrison. It may be recognized through the possession of the following characteristics: Adult female with spines on derm, with seven distinct pairs of abdominal spiracles, each normally with a conspicuous row or band of disk pores within atrium, antennae normally 7- to 9-segmented, beak short conical, obscurely 2-segmented, without suggestion of a marsupium or a band of disk pores on underside of abdomen; larva with 5-segmented antennae, body with spines numerous and conspicuous, large marginal tubular pores, when present, trilocular instead of bilocular, no median ventral cicatrix (uncertain in one genus); adult male with antennal segments beyond second each binodose and bearing two whorls of long setae, with apex of abdomen with more than a single pair of fleshy tassels, and abdomen with seven pairs of spiracles although these are sometimes difficult to locate.

Tribe **Llaveiini,** new tribe.

This tribe is erected for the reception of the Mexican and Central American species that have been assigned at various times to *Llaveia* and *Pro-*

tortonia. Species belonging here may be recognized by the following set of characters: Adult female with derm without, or, in a few species, with spines, abdominal spiracles in seven pairs, without disk pores within atrium of each, antennae normally 9-segmented and anal tube without polygonal wax pores at inner end, or antennae normally 11-segmented, thoracic spiracles with cluster of disk pores at opening and abdomen with three or with as many as 30 ventral cicatrices; larva with normally 6-segmented antennae, seven pairs of abdominal spiracles and dorsal longitudinal rows of spines; adult male with antennal segments beyond third trinodose and each with three whorls of setae, abdomen with more than a single pair of marginal fleshy tassels developed, basal diagonal vein short, at most fading out without approaching the wing margin very closely, not curved towards end, costal margin of wing bright red, and apical antennal segment about as long as preapical.

Llaveia oaxacoensis, new species.

Adult female.—At maturity surrounded by a fairly dense mass of flocculent white waxy secretion, this extended posteriorly to enclose the eggs, this mass not so definitely shaped as to be precisely comparable to the ovisacs of such forms as species of *Icerya;* body of female after oviposition remaining shriveled at the anterior end of the cottony mass; body color of denuded dried female dull red, often irregularly blotched and mottled with darker color; body as mounted almost uniformly elliptical in shape; length range 7-11 mm., width range 4.5-7 mm.; derm membranous to faintly chitinized at maturity; antennae 11-segmented, apparently closely resembling these organs in the other species of the genus, the basal segments stout, much wider than long, the intermediate tapering gradually to the relatively long and slender apical; legs large and stout, the setae along the lower face of femur, tibia and tarsus in each very stout, spine like; beak stout conical, rather distinctly 2-segmented, apex with 12–14 blunt-tipped sensory setae; thoracic and abdominal spiracles as in the other members of the genus, the thoracic much larger and with a loose cluster of around 15–30 disk pores near the opening of each; derm pores abundant as in the other species, of one general type, large disk, with numerous loculi and centers varying, circular, oval, elongate, triangular or quadrilocular; derm setae rather few, as in other species, those in mid-dorsal and mid-ventral areas small, some along margin much larger; body hairs also small, more numerous than setae and somewhat more numerous than the pores, mostly slender, but many, along the margin and to some extent dorsally, much stouter and distinctly spinelike, in this respect differing from the condition in the other species included in the genus.

Larva.—Not available.

Adult male.—Length as mounted on slide about 5 mm., excluding abdominal tassels, antennae the same, total maximum expanse across extended wings 11 mm.; dorsum of head, prothorax, costal border of wing, and abdomen of dried specimens a rather bright brick red; eyes dark reddish-brown, antennae, thorax, legs and remainder of wings blackish to

black; diagonal vein short, extending hardly more than half way to the wing margin; with three pairs of lateral and apical fleshy abdominal tassels.

This species has been described from a series of specimens including holotype adult female and paratype adult females and males and preadults collected by Mr. E. G. Smyth on *Acacia* species at Oaxaco, Mexico, September 22, 1923, while he was engaged in a search through Mexico for parasitic enemies of the Mexican Bean Beetle for the Bureau of Entomology.

The types are in the U. S. National Collection of Coccidae.

Genus **Llaveiella**, new genus.

This genus is here established for the reception of the coccids which Professor Cockerell considered as representing true *Llaveia axin* (Llave). (See Cockerell, Can. Ent. vol. 29, 1897, p. 271; Proc. Acad. Nat. Sci. Phil. for 1899, p. 259, and elsewhere). The writer is unable to accept his conclusion in this, hence the erection of a new genus. It may be separated from its immediate relatives by the following characteristics: Adult female with 9-segmented antennae, about 15 ventral cicatrices, spines retained on body, and hairs and spines together distinctly more abundant than disk pores; larva with both lateral and apical marginal setae elongate and conspicuous, anal opening with a circle of disk pores, and abdomen with a single median circular ventral cicatrix.

The genotype is the species referred to by Professor Cockerell as *Llaveia axin* (Llave) which reference is regarded here as a misidentification, in consequence of which a new specific name *taenechina* is applied to these specimens. No other species is known to belong with this. The generic characters given above together with Professor Cockerell's various de-descriptive notes on the species characterize it adequately.

The holotype adult female and paratype adult females and larvae are in the U. S. National Collection of Coccidae.

The insect was collected at Salina Cruz, Mexico, May 29, 1896, by Dr. C. H. T. Townsend (Div. Ent. No. 7191).

Tribe **Iceryini** Cockerell.

No new genera are characterized in this tribe, but brief descriptions are given below for two new species belonging in genera assigned here.

Icerya similis, new species.

This insect is very closely related to *I. montserratensis* R. and H. and *I. zeteki* Cockerell, differing only, so far as studied, in the apparently constant possession of five ventral cicatrices, in contrast to the three of *montserratensis* and the seven of *zeteki*.

The species is based on specimens collected by Dr. John R. Johnston on coconut leaves (*Cocos nucifera*) (Palmae) from Cocoplum, near Bocas del Toro, Panama, received Feb. 1922 (holotype and paratype); on speci-

mens from Scarborough, Tobago Island, on unknown fruit tree, collected Nov. 7, 1918, by the writer (A–922) (paratypes); on specimens from Port-of-Spain, Trinidad Island, collected by the writer from *Cassia fistula* (Leguminosae) on Nov. 4, 1918 (A–881) and Nov. 23 (A–1044) (paratypes); and from specimens from Port-of-Spain, Trinidad Island, on *Clusia alba* (Guttiferae), collector and date of collection unknown (paratypes).

The types are in the U. S. National Collection of Coccidae.

Steatococcus samaraius, new species.

This species is closely related to *Steatococcus australis* (Maskell), the adult female agreeing with it in possessing large "open center" pores producing glassy threads, but differing in that these do not occur in the mid-dorsal area as in *australis,* and in that the marsupial opening, while not chitinized anteriorly, is supplied here with a narrow band of disk pores.

The species is based on specimens obtained by Mr. Geo. Compere at Samarai, New Guinea, on unstated host (holotype and paratypes).

The types are in the U. S. National Collection of Coccidae.